

SOV/137-59-2-47<sup>63</sup>

Color Reactions for Distinguishing Lanthanum From Cerium

Determination of 3 - 25  $\gamma$  /cc  $Ce^{3+}$  is achieved with  $\leq 10\%$  error.

A. M

Card 2/2

SOV/137-59-2-4854

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 2, p 355 (USSR)

AUTHORS: Korenman, I. M., Frum, F. S., Ryzhkova, L. V.

TITLE: Derivatives of Chromotropic Acid as Reagents for Titanium (Proizvodnyye khromotropovoy kisloty kak reaktivy na titan)

PERIODICAL: Uch. zap. Gor'kovsk. un-ta, 1958, Nr 32, pp 113-117

ABSTRACT: Bibliographic entry

Card 1/1

USCOMM-DC-60,889

I. 48567-65 --- GP(m)/EXP(t)/ZUP(b) LIP(c) JD  
 ACCESSION NR: AR5009904 UR/0081/65/000/004/G024/G024

SOURCE: Ref. zh. Khimiya, Abs. 4G153 24

AUTHOR: Frum, F. S.; Kotel'nikova, G. I. B

TITLE: Determination of iodide trace impurities in sulfur 11

CITED SOURCE: Sb. Peredovyye metody khim. tekhnol. i kontrolya proiz-va, Rostov-na-Donu, Rostovsk. un-t, 1964, 333-336

TOPIC TAGS: trace analysis, sulfur, iodine, impurity content, photometry

TRANSLATION: A method is proposed for detecting trace quantities ( $\geq 1 \cdot 10^{-8}\%$ ) of  $I^-$  in sulfur. The method is based on the catalytic effect of iodine on the oxidation reaction of  $AsO_3^{3-}$  by  $CE(4+)$ .  $Cl^-$  and  $Br^-$  do not interfere with the determination of  $I^-$ . Comparatively large quantities of Os, Hg and Ag also catalyze this oxidation reaction, but these elements are seldom associated with iodine in sulfur. The sensitivity of the method is  $10^{-5}$   $\gamma/ml$  of  $I^-$ . A sample consisting of 1-2 grams of finely pulverized sulfur is strongly agitated for 1-2 hours in 20 ml of doubly dis-

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1. 48567.65

ACCESSION NR: AR5009904

tilled water and centrifuged. Then 0.6 ml of a 0.1 normal solution of  $\text{Ce}(\text{SO}_4)_2$  in a 3.5 normal solution of  $\text{H}_2\text{SO}_4$  and 0.6 ml of a 0.2 normal solution of  $\text{Na}_3\text{AsO}_3$  are added to 5 ml of the centrifuged sulfur which is then held in a  $30^\circ$  water bath for 5 minutes. The solution is photometrically measured with a blue light filter with respect to a  $\text{Ce}(\text{SO}_4)_2$  solution of the same concentration (a solution containing 0.15 ml of a 0.1 normal solution of  $\text{K}_2\text{Cr}_2\text{O}_7$  and 5.5 ml of water may be used as the comparison solution). The  $\text{I}^-$  content is found from the reduction in the intensity of the  $\text{Ce}(4+)$  color, using a calibration chart. The relative error in determination is 20-30%. B. Manole.

SUB CODE: GC, OP

ENCL: 00

Card 2/2

RUMANIA

TIMARIU, S., Dr, TASCENCO, Vl., Chemist, FRUK, M., Eng, and  
CALOTOIU, E., Eng of the Dobrogea Experimental Station (Statiunea  
Experimentală Dobrogea).

"Preliminary Investigations on the Value of Black Sea Algae  
and Their Use in the Feeding of Animals and Birds."

Bucharest, Revista de Zootehnie si Medicina Veterinara, Vol 13,  
No 10, Oct 63, pp 23-29.

Abstract [Authors' English summary modified]: The algae Phylo-  
phora Brodiaei, widely available in the Black Sea coastal waters,  
may be preserved in the form of flour, or pickled as a mixture of  
65% ground algae, 35% rolled corn and 2.5% molasses solution (7  
liters per 100 kilograms of algae). In this case the protein  
contents of the mixture is similar to that of peas, except that  
the algae contain fewer non-nitrogenous extraction substances  
(28.6%) and more mineral salts (38.69%). The nutritive value of  
algae flour is 0.320 Nutritive Units and 85 g A.D. [unidentified]  
while that of the mixture with corn and molasses is 0.365 Nutritive  
Units and 19 g A.D.

Includes 2 tables and 3 references, of which 1 Western  
and 2 Russian.

1/1

FRUMAR, M.

On the luminescence of cadmium iodide activated with lead (II) iodide. Coll Cz Chem 29 no. 3:672-679 Mr '64.

1. Institute of General and Inorganic Chemistry, Higher School of Chemical Technology, Pardubice.

ORLENKO, Yu.M., doktor med. nauk (Khar'kov, ul. Petrovskogo, d.6/8, kv.15);  
FRUMAN, Yu.Ya.

Acute cholecystitis in aged and senile persons. Vest. khir. 89 no.10:  
125-127 O '62. (MIRA 17:10)

1. Iz kliniki obshchey khirurgii (zav. - doktor med. nauk Yu.M. Orlenko)  
lechebnogo fakul'teta Khar'kovskogo meditsinskogo instituta (rektor -  
dotsent B.A. Zadorozhnyy) na baze 11-y Khar'kovskoy gorodskoy klini-  
cheskoy bol'nitsy (glavnyy vrach - Ye.D. Guzhel).

FRUM-KETKOV, R. L. Cand Phys-Math Sci -- (diss) "On the behavior of cycles  
during <sup>continuous</sup> ~~uninterrupted~~ reflections of compacts and multiforms." Mos, 1957.  
8 pp (Mos State Univ im M. V. Lomonosov. Mechanical Math Faculty), 100 copies  
(KL, 44-57, 99)

-7-



FRUM-KETOV, R. L.

20-2-14/62

AUTHOR: Frum-Ketov, R. L.

TITLE: On the Behavior of Cycles in Continuous Mapping of Compacts  
(O povedenii tsiklov pri nepreryvnykh otobrazheniyakh kompaktov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 2, pp. 249 - 252  
(USSR)

ABSTRACT:  $M^n$  and  $M_1^n$  be two  $n$ -dimensional closed orientable manifolds. When  $f$  is a continuous representation of  $M^n$  on  $M_1^n$  with the degree zero, the  $n$ -dimensional main cycle of the manifold  $M^n$  is represented on zero. This applies especially to the representation of  $M^n$  on the  $n$ -dimensional Euclidean space. P.S. Aleksandrov posed the following problem: It may be proved that in the case of any  $k(0 \leq k \leq n-1)$  in  $M^n$  an essential  $k$ -dimensional cycle  $z^k$  exists which represents itself on zero. The present paper gives a positive answer to this problem in a more general formulation. The group of rational numbers is here chosen as group of the coefficients. First the conceptions "essential cycle" and "essential carrier" are defined. The author shows the following: The  $k$ -dimensional essential cycle  $z^k$  is represented with the aid of  $f$  on zero, when a certain es-

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20-2-14/62

On the Behavior of Cycles in Continuous Mapping of Compacts

essential carrier  $\Phi$  of the cycle  $z^k$  is represented as follows: either onto a set that does not contain any  $k$ -dimensional cycles different from zero or onto the  $k$ -dimensional oriented manifold  $M^k$ . In this connection applies  $f(z^k) \sim 0$  in  $M^k$ .

The author gives three comprehensive theorems and partially also their proofs. There is 1 Slavic reference.

ASSOCIATION: Moscow State University imeni M.V. Lomonosov  
(Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova)

PRESENTED: February 13, 1957, by P.S. Aleksandrov, Academician

SUBMITTED: February 13, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHOR:

FRUM-KETKOV, R.L.

20-113-1-11/58

TITLE:

On the Behavior of the Cycles Which are not Homologous to Zero Under Mapping of an  $n$ -Dimensional Manifold Into an  $n$ -Dimensional Euclidean Space (O povedenii tsiklov, ne gologichnykh nulyu, pri otobrazhenii  $n$ -mernogo mnogoobraziya v  $n$ -mernoe yevklidovo prostranstvo)

PERIODICAL:

Doklady Akademii Nauk <sup>SSSR</sup> / 1958, Vol 118, Nr 1, pp 42-44 (USSR)

ABSTRACT:

Let  $M^n$  ( $M_1^n$ ) be an  $n$ -dimensional closed orientable manifold;  $R^n$  the  $n$ -dimensional Euclidean space;  $\Delta^s(K)$  the  $s$ -dimensional Betti group of the complex  $K$ ;  $p^s(K)$  the rank of  $\Delta^s(K)$ ;  $f$  a continuous mapping of  $M^n$  into  $R^n$  or into  $M_1^n$ ;  $\xi^s$  an  $s$ -dimensional homology class of  $M^n$  different from zero. The statement "there exist cycles in this homology class which are mapped by  $f$  into zero" is assumed to mean that in  $R^n$  (in  $M_1^n$ ) there exists a polyhedron  $L$  with the dimension  $\leq s$  so that for each  $\epsilon > 0$  the set  $f^{-1}(\overline{O(L, \epsilon)})$  is the carrier of a cycle of  $\xi^s$  and the image of this cycle in  $\overline{O(L, \epsilon)}$  is homologous to zero. Let  $r_f^s$  denote the maxi-

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On the Behavior of the Cycles Which are not Homologous to Zero Under Mapping of an  $n$ -Dimensional Manifold Into an  $n$ -Dimensional Euclidean Space

maximum number of independent  $s$ -dimensional homology classes with cycles which are mapped by  $f$  into zero. Let  $q_f^s$  be the rank of the subgroup  $\Delta^s(f(M^n))$ , onto which  $\Delta^s(M^n)$  is mapped.

Theorem : Let  $f$  be a continuous mapping of  $M^n$  into  $R^n$  or into  $M_1^n$  of degree zero and let  $p^s(M^n) \neq 0$ . Then it is

$$q_f^s + q_f^{n-s} \leq \frac{p^s(M^n) + p^{n-s}(M^n)}{2}$$

$$q_f^s \leq r_f^{n-s}, \quad q_f^{n-s} \leq r_f^s$$

Let  $f$  be a continuous mapping of  $M^n$  into the polyhedron  $K$ .

Let  $\mu_f^s$  be the maximum number of such independent elements of the group  $\Delta^s(M^n)$  that there exist carriers of cycles of this homology classes which are mapped by  $f$  onto polyhedra which contain no  $s$ -dimensional cycles different from zero. Let

Card 2/3  $\bar{\mu}_f^s$  be the maximum number of the elements of  $\Delta^s(M^n)$  for

On the Behavior of the Cycles Which are not Homologous to  
Zero Under Mapping of an  $n$ -Dimensional Manifold Into an  $n$ -Dimensional  
Euclidean Space 20-116-1-11/58

which there are cycle carriers for every  $\epsilon > 0$ , the mappings  
of which pass over into a polyhedron by an  $\epsilon$ -displacement.

Theorem: Let  $f$  be a continuous mapping of  $M^n$  into  $R^n$  or into  
 $M_1^n$  and  $p^s(M^n) \neq 0$ . Then it is

$$\mu_f^s + \mu_f^{n-s} \gg p^s(M^n) .$$

2 Soviet and 1 foreign references are quoted.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova  
(Moscow State University imeni M.V. Lomonosov)

PRESENTED: June 27, 1957, by P.S. Aleksandrov, Academician

SUBMITTED: June 26, 1957

AVAILABLE: Library of Congress

Card 3/3

AUTHOR: Frum-Ketkov, R.L.

SOV/20-122-3 7/57

TITLE: Homological Properties of the Inverse Images of Points for Mappings of Manifolds Increasing the Dimension (Gomologicheskaya svoystva proobrazov tochek pri otobrazheniyakh mnogobraziiy povyshayushchikh razmernost')

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 349-351 (USSR)

ABSTRACT: Let  $M^n$  denote a closed, orientable  $n$ -dimensional manifold.  $p^s(M^n)$  the rank of the  $s$ -dimensional homology group of  $M^n$ . The rational number field or the residual group mod  $m$  is assumed to serve as coefficient group.  
Theorem: Let  $f$  be a continuous mapping of the  $M^n$  onto the  $m$ -dimensional polyhedron  $K$ ,  $m > n$ ; the inverse images of all points from  $K$  are assumed to be acyclic in all dimensions  $\leq s$ . Then it is  $2s < n-2$ .  
Theorem: Let  $f$  be monotonic, i.e. the inverse image of a connected set is assumed to be connected; let  $f$  map  $M^n$  onto  $M^m$ ,  $m > 3$ . In  $M^m$  there do not exist more than  $p^1(M^3)$  two-dimensional polyhedra so that each of them is essential carrier of a two-dimensional cycle and that for every point  $y$  of these polyhedra it holds:

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Homological Properties of the Inverse Images of Points      SOV/20-122-1 7/51  
for Mappings of Manifolds Increasing the Dimension

$H_1(f^{-1}(y)) = 0$ . Furthermore the paper contains some introducing considerations on the results of Vietoris [Ref 1], Begle [Ref 2,3], Dyer [Ref 4] and Keldysh [Ref 5] and a further closely related theorem.

There are 5 references, 1 of which is Soviet, 1 German, and 3 are American.

PRESENTED: May 12, 1958, by P.S. Aleksandrov, Academician

SUBMITTED: April 29, 1958

Card 2/2

FRANCIS J. L.

Finite diameter of function spaces. Usp. mat. nauk 20 r 4 374-381  
SI-Ag '65.

Some properties of function spaces of finite smoothness. Ibid.:181-186  
(MIRA 18:8)



L 29100-66 EWT(d) IJP(c)

ACC NR: AP6019388

SOURCE CODE: UR/0042/65/020/004/0181/0186

AUTHOR: Frum-Ketkov, R. L.

ORG: none

TITLE: Properties of spaces of functions of finite smoothness

SOURCE: Uspekhi matematicheskikh nauk, v. 20, no. 4, 1965, 181-186

TOPIC TAGS: Lipschitz condition, polynomial Lagrange equation

**ABSTRACT:** The present article follows immediately upon another article by the author appearing in the same issue of the periodical. This article shows that some metric characteristics considered in the first article for spaces of functions of finite smoothness differ no more than  $K$  times from the radius of the maximum  $n$ -dimensional sphere contained in a space in which  $K$  does not depend on  $n$ : i.e., these quantities are weakly equivalent. The upper limit for  $n$  is evaluated. For a class of functions which are defined on a segment and whose derivative of order  $p$  satisfies the Lipschitz condition with a fixed constant, the author evaluates the accuracy of the following method of defining functions of this class by means of  $n$  real parameters: The determining segment is divided into  $n - 1$  equal parts and the values of a function are taken at the points of division. The value of

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UDC: 5.17.5

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a function at an arbitrary point is determined according to the corresponding localizable Lagrange interpolation polynomial of degree  $p + 1$ . It is found that any other method of defining functions of this class by means of  $n$  real parameters provides an accuracy no better than  $K_1$ -fold, as compared with the above-indicated method, where  $K_1$  is a constant not dependent on  $n$ . This is also true for the corresponding class of functions defined on an  $s$ -dimensional cube,  $s \geq 2$ . For the simplest classes  $s = 1$ ,  $p \leq 1$ , where accurate evaluation can easily be made, the aforementioned method is found to be the most accurate method of defining functions by means of  $n$  real parameters. Orig. art. has: 9 formulas.

[JPRS]

SUB CODE: 12 / SUBM DATE: 20Jul63 / ORIG REF: 004

Card 2/2 CC

FRUMAN, K.I., inzh.

Dynamics of a tractor-drawn trenching unit with active working  
elements. Stroil. i dor. mash. 10 no.3:20-22 Mr '65.  
(IIRA 18:5)

LOBANCHENKO, N.G., inzh.; GUSEYNOV, M.Kh., inzh.; FRUMEN, B.V., inzh.

Experience in constructing and operating an open electric power  
plant. Elek.sta. 32 no.8:14-19 Ag '61. (MIRA 14:10)  
(Electric power plants)

FRUMEN, L.N.

**Treatment of alkaline oil-refining sludge.** E. A. Eminov and L. N. Frumen. *Russ. 51,920, Nov. 30, 1937.* Alkali petroleum sludge is treated with a soln. of NaOH of at least 16%<sub>42</sub>, settled, the oil removed, the alkali soln. again treated with at least 16%<sub>42</sub> NaOH, and washed, and the soap naphthenic soaps are treated with kerosene alkali sludge for final wash of the oil. The soaps are then used in the usual manner.

ASO SLA BIBLIOGRAPHICAL LITERATURE CLASSIFICATION

FRUMEN, L.N.

CA

Demulsifier for petroleum emulsions from petroleum acid sludge. L. N. Frumen. Izvestiya Akad. Nauk SSSR Khim. 26; No. 7, 27-31(1947). The bulk of H<sub>2</sub>SO<sub>4</sub> is removed by washing the acid sludge with H<sub>2</sub>O and steam. The sludge is then dissolved in kerosene or similar fraction, and is kept in acid-proof settling tanks to settle out the remaining 1-2% H<sub>2</sub>SO<sub>4</sub>. The wdg. out kerosene-dissolved sludge is transferred into vats where it is neutralized with a 10% lime soln. at 80-90° with methyl orange as an indicator. Depending on the origin of the sludge, the neutralized product (demulsifier) has the following characteristics: d<sub>4</sub><sup>20</sup> 0.920-0.930, Engler viscosity (50) 10-20, H<sub>2</sub>O content (Dean and Stark method) up to 3%, reaction to methyl orange neutral, and freezing p. -12-20°. For use and primarily for ease of transportation this product is dissd. with 20-30% of kerosene. Demulsification of oil from various wells at 50-60° with 1-3% of the demulsifier caused the wpg. out of almost all of the H<sub>2</sub>O in 1-3 hrs. M. Hosh

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

STON BOWERY

RECEIVED MAY 29 1951

FRUMEN, L.N.

FRUMEN, L.N.

\* Controlling alkali exhaustion in alkali purification of petroleum products. Azerb.neft.khoz. 36 no.8:34-36 Ag '57. (MIRA 10:11)  
(Petroleum products) (Alkalies)

26521  
S/065/61/000/008/005/009  
E030/E135

11. 0140

AUTHORS: Ismailov, R.G., and Frumen, L.N.  
TITLE: Inhibiting the formation of emulsions in the alkali washing of petroleum products with the aid of electrolytes

PERIODICAL: Khimiya i tekhnologiya topliv i masel, 1961, No.8, pp. 28-31

TEXT: This work was carried out under the auspices of the Azerbaydzhan Sovnarkhoz (Baku refinery). Use is suggested as prophylactic agents, of electrolytes whose surface-active groups have signs equal and opposite to those of the alkali. Thus, in a hydrophilic system use polyvalent cations, and in a hydrophobic system use anions. The effectiveness of the method should increase strongly with valency. Care must be taken to avoid excess addition, otherwise emulsions of the opposite type may form. For laboratory tests, light diesel fuels were given alkaline wash with an insignificant amount of free alkali (0.2%) in the form of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$ ; electrolytes added were sea water, cooking salt, sodium sulphate and magnesium sulphate.

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26521

Inhibiting the formation of ....

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E030/E135

The distillate and reagents were mixed for 1-2 minutes at 60-70 °C and then maintained at that temperature. The time taken for removal of alkali was taken as index of the electrolyte's effectiveness (see Table 1).  $MgSO_4$  (sea-water) is seen to be best, perhaps because of the divalent ion, or a synergistic effect due to the other ionic impurities in it. Hard well water, and extract from cationic filters from boiler units (containing  $Na^+$ ,  $Mg^{++}$  and  $Ca^{++}$ ) are equally effective. Results have been verified on a full-scale continuous unit at 75-85 °C using 3-4% solution of NaOH in two or three stages, depending on the acidity of the fuel. There are 2 tables.

ASSOCIATION: Sovnarkhoz Az. SSR, Bak. NPZ

11

Card 2/ 3

ISMAILOV, R.G.; FRUMEN, L.N.

Preventing emulsion formation in the alkali refining of  
petroleum products by means of electrolytes. Khim.i  
tekhnol. masel 6 no.8:28-31 Ag '61. (MIRA 14:8)

1. Sovnarkhoz Azerbaydzhanskoy SSR i Bakinskiy  
neftepererabatyvayushchiy zavod.  
(Diesel fuels)

CA. FRUMER, L.A.

9

Effect of alloying elements on the properties of low-carbon steel. V. A. Delle and L. A. Frumer. *Stal* 8, 619-25 (1948).—The effect of Si, Mn, Cr, Ni, Mo, Cu, and Ti, severally and combined, was studied on the mech. properties of annealed or normalized low-C steel. The properties of annealed at 1600 ± 10 °F followed by tempering at 670 ± 10 °F for 2 or 10 hrs. and an cooling. The predominant microstructure of the unalloyed and singly alloyed specimens was ferrite with a small quantity of pearlite, and of the multi-alloyed it was ferrite with some sorbite. The grain size of all specimens was fine. Reserve strength were detd. on the specimens. The results of 30-40 detns. of reserve elasticity were used to construct diagrams of transition to brittleness temps. All of the alloying elements increased the elasticity and the tensile strength. Si, Mn, and Mo were most effective. Ni and Cr had little effect. Of the elements only Cr improved the impact strength. Ni, Cu in any amt., and Mn up to 1% lowered the temp. at which the steel becomes brittle. Si, Cr, and Mn above 1% raised the transition temp. M. Hosh

FRUMER, L. A.

32-2-51/60

AUTHORS: Frumer, L. A. , Chistov, N. M.

TITLE: A Device for the Determination of Potentials in Electrolytic Coatings (Pribor dlya opredeleniya napryazheniy v elektroliticheskikh pokrytiyakh)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 2, p. 244 - 245 (USSR)

ABSTRACT: An investigation method was developed , which is based on a scheme already proposed in publications (reference 1). A replaceable spiral which was wound from a steel, brass or copper strip (thickness 0,25 - 0,5 mm) served as cathode. By this means many shortcomings of the hitherto applied cathode consisting of a metal strip were avoided. Because of the small distance of the spiral windings the electrolytic coating is formed uniformly and only at the outside of the spiral. The potential changes of the cathode which are caused by the depositing of the electrolytic substance during electrolysis are recorded by a pointer. From this value the mean

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32-1-51/60

A Device for the Determination of Potentials in Electrolytic Coatings

potential of the coating is calculated according to a formula. If an increase in measurement accuracy is desired, the spiral-constant K may be determined. The error limit of this method of determination is about 10 %. The curves of the dependence of the coating thickness of a chromium coating measured in  $\mu$  (electrolyte  $\text{CrO}_3$  - 300 g/l,  $\text{H}_2\text{SO}_4$  - 4 g/l) on the mean potential are given. There are 2 figures, and 1 reference, which is Slavic.

AVAILABLE: Library of Congress

1. Cathodes (Electrolytic cell)-Design

Card 2/2

TESLER, Pinchus Shovich, kand.tekhn.nauk, starshiy nauchnyy sotrudnik;  
FRUMES, Zakhar Yakovlevich, inzh.; KOTS, Isaak Davidovich, inzh.;  
 GODYNA, A.K., inzh., red.

[Built-up roof with slabs made of cellular concrete] Sovmeshchennaya  
 krysha s paneliami iz iacheistogo betona; opyt tresta "Donbassenergo-  
 stroi," Nauchno-issledovatel'skogo instituta betona i zhelezobetona  
 i Eksperimental'no-konstruktorskogo biuro Akademii stroitel'stva i  
 arkhitektury SSSR. Moskva, Gosizd-vo lit-ry po stroit., arkhit. i  
 stroit.materialam, 1961. 16 p. (MIRA 14:11)

1. Nauchno-issledovatel'skiy institut betona i zhelezobetona Akademii  
 stroitel'stva i arkhitektury SSSR (for Tesler). 2. Nachal'nik otdela  
 stroitel'nykh konstruktov Eksperimental'no-konstruktorskogo biuro  
 Akademii stroitel'stva i arkhitektury SSSR (for Frumes). 3. Glavnyy  
 inzh. tresta "Donbassenergostroy" (for Kots).  
 (Roofing, Concrete) (Lightweight concrete)

FRUMIN, A. B.

I  
751  
.KF

Vneshnyaya trgovlya stran narodnoy demokratii (Foreign trade for the  
countries of people's democracy, ed. by) M. F. Kovrizhnykh i A. B. Frumin.  
Moskva, Vneshtorgizdat, 1955.  
319 p. tables.

FRUMIN, G., kand. tekhn. nauk (Kiyev)

"Present and future in our cities" by B. Svetlichnii. Reviewed  
by G. Frumin. Zhil.-kom. khoz, 13 no.5:30 My '63.

(MIRA 16:8)

(City planning) (Svetlichnii, B.)



FRUMIN, G., kandidat tekhnicheskikh nauk.

Textbook on planning settlements ("Planning and building workers' settlements" by M.I.Kurennoi. Reviewed by G.Frumin). Gor.i sel'.stroil. no.4:26 Ap. '57. (MLRA 10:5)

(Regional planning)  
(M.I.Kurennoi)

FRUMIN, G., kand.tekhn.nauk

Distribution of institutions of cultural facilities and municipal  
services. Zhil.-kom. khoz. 8 no.9:18-19 '58. (MIRA 11:10)  
(Municipal services)

FRUMIN, G.I., kand.tekhn.nauk

New book on city building ("Building Soviet cities; architectural  
and planning problems. Reviewed by G.I. Frumin) Gor.khoz.Mosk. 32  
no.12:43 D '58. (MIRA 11:12)

(City planning)

FRUMIN, G., kand.tekhn.nauk

Some problems in mass housing construction. Zhil.stroi. no.11:  
22-24 '59. (MIRA 13:4)  
(City planning)

FRUMIN, G., kand. tekhn. nauk

"The distribution of housing construction in cities." Reviewed  
by G. Frumin, Zhil. stroi. no.2:32 '62.

(MIRA 15:1)

(City planning)

FRUMIN, G.I., kand.tekhn.nauk

"Planning and building habitable cities." Izv.ASiA no.3:127-128  
'62. (MIRA 15:11)

(City planning)

FRUMIN, G., starshiy nauchnyy sotrudnik

"Microdistricts in the planning and building of cities" by  
P. I. Dubrovskii. Reviewed by G. Frumin. Zhil.-kom. khoz. 12  
no.3:31 Mr '62. (MIRA 15:10)

1. Akademiya stroitel'stva i arkhitektury Ukrainskoy SSR,  
Kiyev.

(City planning) (Dubrovskii, P. I.)

FRUMIN, G.I., inzh.

Mechanization of operations in stockyards. Mashinostroenie  
no. 2:14-16 Mr-Ap '64. (MIRA 17:5)



1268-65 EWT(m)/EWP(k)/EWP(g)/EWA(d)/EWP(v)/EWP(t) PF-4 KJW/JD/HK/  
 ACCESSION NR: AP4045458 S/0125/64/000/009/0036/0041

AUTHOR: Neroderko, M. M. (Engineer); Frumin, I. I. (Doctor of technical sciences)

TITLE: Mechanized hard facing of cold blanking dies B

SOURCE: Avtomaticheskaya svarka, no. 9, 1964, 36-41

TOPIC TAGS: hard facing, mechanized hard facing, hard facing electrode, sintered ribbon electrode, dispersion hardenable alloy electrode, blanking die hard facing, wear resistant blanking die

ABSTRACT: A technique has been developed for production of sintered flat electrodes from powders of age-hardenable alloys for mechanized hard facing of precision blanking carbon steel dies. Of several hard-facing alloys which were developed and tested, an alloy of the K30H18 type, containing 0.03—0.04% C, 0.60—0.80% Mn, 0.2—0.5% Si, 17 to 19% Mo, and 28—32% Co and deposited with the AN-60 flux, was the hardest after aging. Hard facing with the K30H18 flat electrode produced a well-formed, sound, wear-resistant layer on a low-carbon steel plate. A continuous bead, 10—15 mm wide and 2—5 mm high, is readily

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L 11293-65

ACCESSION NR: AP4045458

formed in a single pass. The deposited metal has a hardness of 43 to 45 HRC which increases to 68—72 HRC after aging at 600C for 1 hr. This increase in hardness is caused by decomposition of a supersaturated solution, accompanied by the formation of highly dispersed particles of a solid solution of CoMo and Fe<sub>3</sub>Mo<sub>2</sub> compounds. After aging, the dimensions of parts hard-faced with K30M18 alloy differed by less than 0.05% from the initial dimensions. In production tests, blanking dies hard-faced with the K30M18 alloy were 15—30 times as wear resistant as dies made of tool steels. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut elektrosvariki im. Ye. O. Patona AN UkrSSR (Electric Welding Institute, AN UkrSSR)

SUBMITTED: 15Mar64

ATD PRESS: 3104

ENCL: 00

SUB CODE: MH, IE

NO REF SOV: 011

OTHER: 003

Card 2/2

FRUMIN, G.L., inzh.

Shell-mold casting house. Mashinostroenie no.3:41-43 M-Je 'c4.  
(MIRA 17:11)

CA

9

THE CORROSION OF FLANGES OF WATER PIPES. L. I. Frumkin and D. M. Rabkin. *Korrosiya i Zashchita Met.* No. 5, 6, 76 (1940); *Khim. Refert. Zhur.* 4, No. 7-8, 151 (1941).

Corrosion of flange couplings of pipes with various gaskets in a continuous circulation of 1.5% NaCl solution containing 0.02%  $H_2O_2$  was studied for the purpose of selecting flange gaskets for the material of pipes for the factory of the Soviets. The depth of corrosion was determined with an accuracy of 0.01 mm. by an app. designed by Dyakon. In all cases the seams corroded to a greater degree than did the metal of the pipe and flange. Al, Cu, Pt, rubber and klingerite gaskets were tried. Best results were obtained from klingerite gaskets; they corroded very little and did not induce corrosion of the adjacent regions of the metal.

W. R. Henn

ALSO SEE: METALLURGICAL LITERATURE CLASSIFICATION

DESIGNATION: 147080-02

CLASSIFICATION: 147080-02

147080-02

FRUMIN I. I.

USSR/Welding - Strength  
Corrosion

Jun 1947

"Methods of Measuring the Corrosion of Welded  
Joints," I. I. Frumin, Institute of Arc-Welding  
of the Academy of Sciences, Ukrainian SSR, 9 pp

"Zavodskaya Laboratoriya" No 6

Discusses the peculiarities of corrosion of welded  
joints and the difficulties encountered in trying  
to measure the degree of corrosion. Discusses  
methods of measurement by permeation. Tests on  
intercrystalline corrosion. Differential - weight  
method.

17T54

Ca

1ST AND 2ND REPEATS

PROCESSES AND PROPERTIES INDEX

103 AND 1TH COPIES

9

Measurement of the corrosion of welded joints. I. I. Prumla. *Zavodskaya Lab.* 13, 693-701 (1947).—The depth of penetration of corrosion is detd. by exploration with a profilometer, preferably on plastic replicas. Inter-cryst. corrosion is observed on specimens under stress. In the differential wt. method, the welded sample is exposed along with an unmolded sample of the same metal and the same size. By this method, copper steels welded with low-C steel proved to be less corrosion-resistant at the seam than in the mass. The contrary was found in welded Mn steels.

N. Thon

COMMON ELEMENTS

MATERIALS INDEX

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

FROM SYNOZIVO

103400 H17 GNV GOC

SYNOZIVO

FROM SYNOZIVO

SYNOZIVO GNV GNV

FRUMIN, I. I.

Frumin, I. I. "Automatic welding of SKh12 steel ", Trudy Vsesoyuz. konf-tsi po avtomat. svarke pod flyusom, 3-6 October 1947, Kiev, 1948, p. 116-24.

SO: U-3261, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, No. 11, 1949).

FRUMIN, I. I.

Frumin, I. I. and Rabkin, D. M. "On fluxes for the automatic welding of low-carbon steels", Trudy po avtomat. svarke pod flyisom (In-t elektrosvarki in. Patona), Collection 3, 1948, p. 3-12.

SO: U-3261, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, No. 11, 1949).



FRUMIN, I. I.

USSR/Engineering - Welding  
Flux

Oct 49

"Formation of Pores in Welded Seams and the Influence of Flux Composition on Tendencies Toward Porosity,"  
I. I. Frumin, Cand Tech Sci, I. V. Kirido, Engr,  
V. V. Podgatskiy, Engr, Inst of Elec Welding Invent  
Acad Ye. O. Paton, Acad Sci Ukrainian SSR, 11 pp

"Avtogen Delo" No 10

Discusses determination of quantity and composition of gases evolved during welding under flux, for dense and porous seams, influence of impurities in the metal and viscosity of molten flux on pore formation, effect of supplementary introduction of gas

152726

USSR/Engineering - Welding (Contd)

Oct 49

into the arc cavity, data of spectrum investigation of arc in presence of flux vapor, mechanism of pore formation, behavior of fluorine compounds during welding, and similar data. States conclusions. Includes 14 tables and 10 diagrams.

152726

FRUMIN, I. I.

Frumin, I. I. - "The production of pumiceous flux for automatic welding," Trudy po avtomat. svarke pod flyusom (In-t elektrosverki im. Patona), Symposium 4, 1949, p. 39-55, - Bibliog: 8 items

SO: U-4355, 14 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 15, 1949)

FRUMIN, I. I.

Frumin, I. I. "On air granulation of flux for automatic welding", Trudy po avtomat. svarke pod flyusom (In-t elektrosvarki im. Patona), Collection 5, 1949, p. 48-52.

SO: U-4392, 19 August 53, (Letopis 'Zhurnal 'nykh Statey, No 21, 1949).

FRUMIN. I. I., KIRDO, I. V., PODGAYETSKIY. V. V.

Inst. Electric Welding im. Ye. O. Paton, Ukrainian Acad. Sci., (-cl949-)

Cand. Technical Sci.

"The formation of pores in welded seams and the influence of flux composition on tendencies toward porosity," Avtogen. Delo, No. 10, 1949.

*FRUMIN, I. I.*

AID P - 857

Subject : USSR/Engineering

Card 1/1 Pub. 11 - 3/13

Authors : Frumin, I. I., Pokhodnya, I. K. and Kirdo, I. V.

Title : Bimetallic rotary cutter for drilling bits

Periodical : Avtom. svar., #4, 29-45, J1-Ag 1954

Abstract : A new method of construction of cutters for drilling bits is described with an outline of successive processes from the initial preparation of the bit, welding of bimetallic armoring powders, tempering and fine shaping. The author presents composition metallographic analysis, results of mechanical laboratory tests, and wearing characteristics during actual service. Four diagrams, 6 microphotographs, 10 photographs, 4 tables and 19 references, 15 Russian (1938-1952).

Institutions: All-Union Scientific Research Inst. for Oil Well Drilling; Institute of Electric Welding im E. O. Paton

Submitted : My 20, 1954

FRUMIN, I.I.

Increasing the durability of rollers by weld deposition. Avtom.  
svar. 7 no.3:3-25 My-Je '54. (MLRA 7:7)

1. Institut elektrosvarki im. Ye.O.Patona Akademii nauk USSR.  
(Rolls )Iron mills)) (Welding)

1. (Soviet), I.I.

BENJIA, F.F., kandidat tekhnicheskikh nauk; VOL'PERT, G.D., inzhener;  
YF'EL'YANOV, N.P., kandidat tekhnicheskikh nauk; KLEKOVKIN, G.P.  
inzhener; KUZMAK, Ye.M., doktor tekhnicheskikh nauk, professor;  
NILOVSKIY, I.A., laureat Stalinskoy premii; PANOV, B.N., inzhener;  
POKHODNYA, I.K., inzhener; FRUMIN, I.I., kandidat tekhnicheskikh  
nauk; FRUMIN, S.R., inzhener; ZVEGINSEVA, K.V., inzhener, redak-  
tor; GOLOVIN, S.Ya., inzhener, redaktor; MATVEYEVA, L.S., redaktor;  
SOKOLOVA, T.F., tekhnicheskij redaktor.

[Automatic built-up welding with wear-resistant alloys] Avtoma-  
ticheskaya neplavka iznosostoichivymi splavami. Moskva, Gos.  
nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1955. 244 p.(MLRA 8:11)  
(Electric welding)

FRUMIN, I. I.; POKHODNYA, I. K.

Investigating the mean temperature of the submerged melt. Avtom.  
svar.8 no.4:13-30 J1-Ag'55. (MLRA 8:11)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki imeni  
Ye.O.Patona Akademii nauk USSR  
(Electric welding)



POKHODNYA, I.K.; FRUMIN, I.I.

Flux temperature in the submerged arc process. Avton. svar. 8  
no.5:14-24 S-0 '55. (MLRA 9:1)

1.Ordena Trudovogo krasnogo znameni institut elektrosvarki imeni  
Ye.O.Patona AN USSR.  
(Electric welding) (Thermocouples)

PRUMIN, I.I.

Increasing the strength of rolling-mill rolls. Visnyk AN URSS  
26 no.10:55-59 0 '55. (MLRA 9:1)  
(Rolling mills)

FRUMIN, Isidor Il'ich; PETRICHENKO, Valentin Kuz'mich; PODGAYETSKIY, V.V.,  
otvetstvennyy redaktor; ANDREYEV, S.P., tekhnicheskiiy redaktor

[Automatic welding in hard facing steel rolled girders; a practical  
manual] Avtomaticheskaya naplavka stal'nykh prokatnykh valkov;  
prakticheskoe rukovodstvo. Khar'kov, Gos. nauchno-tekhn. izd-vo  
lit-ry po chernoi i tsvetnoi metallurgii, 1956. 114 p. (MLRA 9:10)  
(Welding) (Girders)

SOV/137-57-11-21684

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 148 (USSR)

AUTHORS: Frumin, I.I., Pokhodnya, I.K.

TITLE: Automatic Hardfacing of Certain High-alloyed Steels (Avtomati-  
cheskaya naplavka nekotorykh vysokolegirovannykh staley)

PERIODICAL: V sb.: Probl. dugovoy i kontakt. elektrosvariki. Kiyev-  
Moscow, Mashgiz, 1956, pp 162-175

ABSTRACT: A description of methods for prevention of the formation of pores, cracks, and slag inclusions in the process of hardfacing under flux of high-alloy steels by means of powdered welding rods (PWR); the technology of depositing a layer of die-type steel of the 3Kh2V8 and Kh12VF type by means of welding is described, together with the development of necessary fluxes. Gaseous H, N, and CO are the primary cause of porosity. The H must be chemically combined into compounds that are insoluble in molten metal (OH and HF).  $\text{SiF}_4$  is the main source of F. If the hardfacing operations are performed under low-silicon flux (LSF), the PWR are augmented with  $\text{Na}_2\text{SiF}_6$ . In order to prevent penetration of N into the molten metal, it is proposed

Card 1/3

SOV/137-57-11-21684

#### Automatic Hardfacing of Certain High-alloyed Steels

that a gas medium be used in addition to the protective slag medium. Reducing the molten metal with the aid of Si, Ti, Mn, Cr, etc., precludes the formation of pores produced by the CO gas: Three types of cracks are described (hot and cold cracks, and cracks in the vicinity of the weld), reasons for their appearance are given, and methods for their prevention are outlined: Preliminary heating into a range above the martensite point of the parent metal; application of the LSF; leveling off the temperature at the end of hardfacing operations followed by uniform cooling of the components. Utilizing the steel Kh12 as an example, it is demonstrated that hot cracking may be avoided if the amount of liquid eutectic is increased (the C content is raised from 1.0-1.5% to 1.8-2.1%). The process of segregation of slag and metal in the bath is described; it is noted that  $\text{Cr}_2\text{O}_2$  and  $\text{V}_2\text{O}_3$  intensify the similarity between the slag lattice and the lattice of  $\text{Fe}\delta$ , which results in an increased number of slag inclusions. Essential characteristics required in fluxes are listed, and chemical composition, technological properties, and fields of application of LSF's (AN-10, AN-22, AN-20, AN-30) are described. The technology of hardfacing an area with a layer of die-type steel Kh12VF employed in cold-stamping (2.0% C, 12.5% Cr, 1.0% W, 1.0% Mn) involves the following procedures and materials: Electrode rods employed, PP-Kh12VF (PP= powdered welding rods); preliminary heating of blanks

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SOV/137-57-11-21684

#### Automatic Hardfacing of Certain High-alloyed Steels

300 mm long and 100 mm in diameter to a temperature of 400-450°C in an induction furnace operating on a current of industrial frequency; introduction of AN-30 flux; final cooling after hardfacing in the furnace. It is recommended that annealing operations follow an isothermal cycle. The technology of hardfacing, by means of depositing a layer of die-type steel K2V8 (0.35% C, 2.5% Cr, 8.5% W, and 0.3% V), employed for drop forging, on blanks with a diameter of 300 mm consists of the following procedures: Preliminary heating to 350-370°C; hardfacing of blanks in 4-5 passes utilizing direct current with a reversed polarity (220-250 a, 25-28 v), the rate of welding being 35-45 m/hr; flux AN-20 is employed together with powdered welding rods 3.5 mm in diameter; after completion of the hardfacing operations the finished components are heated to a temperature of 370-400°C and are then cooled in a heat-insulated box at a rate of 20°C/sec. The authors point out that steels G13, R18, and R9 have been successfully employed for hardfacing of components.

V.B.

Card 3/3

*Frumin, I. I.*

137-1957-12-24201

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 186 (USSR)

AUTHOR: Frumin, I. I.

TITLE: Increasing the Wear Resistance of Machine Parts by Means of Surfacing by Automatic Welding. (Povysheniye iznosostoykosti detaley mashin putem avtomaticheskoy naplavki)

PERIODICAL: V sb.: Povysheniye iznosostoykosti i sroka sluzhby mashin. Kiyev-Moscow, Mashgiz, 1956, pp 322-328

ABSTRACT: In the process of increasing the wear resistance of machine parts by building up their surfaces by welding the alloying components may be introduced into the welds by either of two methods: through flux [a drawback of this method is a considerable fluctuation in the chemical composition of the built-up layer of metal (BLM) ], and through the welding wire which involves the employment of expensive and hard-to-find wire. An effective solution is the employment of the "powdered" rod (PR) in conjunction with low-silicon fluxes of the AN-20 or AN-30 type containing no manganese. The technological peculiarities of the automatic welding of a BLM of high-alloy steel by means of PR's are described: they involve the employment of low-silicon

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137-1957-12-24201

Increasing the Wear Resistance of Machine Parts (cont.)

flux, which assists the process of branching out of the primary crystals, and favors a uniform distribution of the liquating additives; the absence in the flux of the oxidizing agents MnO and FeO ensures the easy segregation of the slag and does not impair the continuity of the surfacing process; flux AN-20 containing about 20 percent  $\text{SiO}_2$ , is used successfully to prevent the formation of pores, but it has the drawback of fluidity and of contaminating the BLM with Si; flux AN-30, containing 2 - 5 percent of Si, is devoid of the drawbacks of the AN-20 flux, but is rather inefficient in preventing the formation of pores; in order to eliminate the basic cause of pore formation, namely the liberation of H, sodium fenosilicate ( $\text{Na}_2\text{SiF}_6$ ) . . .

[Transl. Note: the Russian original reads " $\text{Na}_2\text{SF}_6$ " which is incorrect], is introduced into the core of the PR; at high temperatures the  $\text{Na}_2\text{SiF}_6$  is decomposed and liberates  $\text{SiF}_4$ , which then reacts with H to form HF which is not soluble in liquid steel; in order to prevent cracks, the pre-heat temperature must lie between 300-600°; for bodies of rotation 100 mm in diameter or more, it is recommended that induction hysteresis heating by means of industrial -frequency alternating current be used.

Card 2/4



137-1957-12-24201

Increasing the Wear Resistance of Machine Parts (cont.)

The technology of building up surfaces of rolls for hot-rolling mills by welding is described as it is employed at metallurgical plants; the preliminary induction heating to a temperature of 350-400° is followed by welding with PR 3 Kh 2 V 8 which imparts the following chemical composition to the BLM (in percent): C 0.35, Cr 2.5, W 8.5, and V 0.5; the flux used is the AN-20 type. The characteristics of the welding installations are described and a computation of the economic effectiveness of the process is given. A technology for the manufacture of bimetallic cutting cones of drill bits is developed; following a preliminary heating to a temperature of 450-500°, the surface of the case-hardened 12 Kh N 2 or 18 Kh G T steel is covered, by means of welding with Kh 12 V F steel which contains (in percent): C 2.0, Cr 12, W 1.0, and V 0.5; the flux used in this process is of the AN-30 type. After annealing and machining, the tooth surface is reinforced with VPE sintered powder and then tempered; this is accompanied by simultaneous carburization of the internal surfaces of the cone. Tests conducted in the stand have shown that the durability of cones manufactured in this manner surpasses that of the conventional cones by 6-7 times. Photographs of the PR in operation are shown, as well as photographs of the grooved surface of

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137-1957-12-24201

Increasing the Wear Resistance of Machine Parts (cont.)

a worn out roll , and the sequence of operations in the manufacture of the bi-metal cones.

V. B.

1. Automatic welding-Applications  
Applications

2. Hard surfacing-

Card 4/4

PERIODICAL ABSTRACTS

Sub.: USSR/Engineering

AID 4190 - P

FRUMIN, I. I., D. M. RABKIN, V. V. PODGAYETSKIY, I. K. POKHODNYA, and  
E. I. LEYNACHUK.

NIZKOKREMNISTYYE FLYUSY DLYA AVTOMATICHESKOY SVARKI I NAPLAVKI  
(Low Silicic Fluxes in Automatic Welding and Hard Facing).  
Avtomaticheskaya svarka, no. 1, Ja/F 1956: 1-20.

A discussion of the application of various special fluxes with a low silicic content, like the AN-10, AN-20, AN-22 and AN-30, used in welding of alloyed steel to achieve better results and prevent formation of pores in welded seams. The authors present the chemical composition of built-up metal, formation of built-up metal and bead, structure of built up metals, and tendency for formation of crystallized flows, separation of clinker, etc. Thirteen tables, some macropictures, graph and sketch. Sixteen Russian references, 1946-1955.



SOV/137-58-7-14748

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 115 (USSR)

AUTHOR: Frumin, I.I.

TITLE: Increasing the Life of Steel Rolling-mill Rolls by Automatic Facing (Povysheniye stoykosti stal'nykh prokatnykh valkov posredstvom avtomaticheskoy naplavki)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernoy metallurgii, 1956, Vol 10, pp 176-192

ABSTRACT: An investigation is made of increasing the service lives of rolls (R) by automatic facing (F). The backing of a bimetallic R should be of an inexpensive, strong, and tough metal (C or Cr steel), whereas the working surface should be made of a metal of maximum wear resistance (high-alloy steel). The wear resistance of the working surface of rolling-mill R depends upon their resistance to thermal fatigue and wear at high temperatures. Grade 3Kh2V8 Cr-W steel is the type best suited to the working layer of rolling-mill R. A process has been developed for the F of a layer of 3Kh2V8 steel involving a powder-wire electrode of the appropriate composition in conjunction with AN-20 low-silicon flux. Local heat treatment of faced R

Card 1/2

SOV/137-58-7-14748

Increasing the Life of Steel Rolling-mill Rolls by Automatic Facing

with the aid of induction heating has been developed, making it possible to obtain the desired structure and hardness. An examination is made of the technique of F a wear-resistant layer that affords good forming of the clad metal. This method employs roll-turning and universal roll-facing machines. It is shown that the F of 3Kh2V8 steel on the working surface of the R makes it possible to increase strength 8 to 10-fold over that of forged R of Nr 55 steel, 3.3-4-fold over that of hardened R of 60KhG steel, and 1.7-3-fold over heat-treated 15KhNM steel rolls. This permits a saving of 65-90% of the annual expenditures upon steel R, and a considerable increase in the output of the mills.

1. Rolling mills--Performance      2. Rolling mills--Equipment      3. Rolling mills--Maintenance      V.K.

Card 2/2

FRUMIN, I.I.

Mechanics of crystallization crack formation in welding and  
hard facing. Avtom. svar. 10 no.1:88-102 Ja-P '57. (MLRA 10:4)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im.  
Ye.O. Patona AN USSR.

(Electric welding) (Hard facing) (Deformation (Mechanics))

FRUMIN, I.I.

FRUMIN, I.I.

Size of metal droplets carried by the arc. Avtom. svar. 10 no.5:  
64-70 8-0 '57. (MIRA 10:12)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O.  
Patona AN USSR.

(Electric welding)



~~FRUMIN, I.I.~~  
FRUMIN, I.I.

Kinetics of the interaction between metal and slag in welding  
under flux. Avtom.svar. 10 no.6:3-18 N-D '57. (MIRA 11:1)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki  
im. Ye.O. Patona AN USSR.

(Electric welding)

FRUMIN, I. I.

Frumin, D.A., Candidate of Technical Sciences

the Third Scientific and Technical Conference in Kiev on the Improvement of the Wear Resistance and Service Life of Machines (Tret'ya Kievskaya nauchno-tekhnicheskaya konferentsiya po povysheniyu iznosostoykosti i sroka sluzhby mashin)

Journal: Vestnik Mashinostroyeniya, 1958, No. 2, pp. 91-92 (USSR)

**ABSTRACT:** The conference was organized by the Kiev region of the NTO Mashprom (The Scientific and Technical Organization of the Mechanical Engineering Industry) and by the Institute of Mechanics of Building Structures, Ac.Sc. Ukrainian SSR (Institut stroitel'noy mekhaniki AN USSR). 430 delegates representing the major institutions of the Ac.Sc. USSR and of the Ukrainian SSR, the specialized research agencies and the large Soviet plants heard and discussed 90 papers devoted to the study of the mechanism of disintegration of surface layers in machine components and to new methods of improving the wear life of components.

In a paper by Academician S.V. Sorensen, entitled "Mechanisms Related to Wear and Fatigue", a survey of Russian and foreign studies was given with emphasis on fatigue failures caused by wear, both as a result of the mechanical consequences due to

Card 1/8

Scientific and Technical Conference on the  
 Problems of the Wear Resistance and Service Life of Machines

wear and the formation of slip marks as a result of a change in the physical and chemical conditions of contact surfaces.

A. D. Grosin, Corresponding Member of the Ac. Sc. USSR, in a paper entitled "The Complex Method of Analysis of Components Working Under the Conditions of Rolling Friction" presented a method which includes the combined use of electron microscope, X-ray diffraction and spectroscopic analyses to judge the condition of the surface layers in association with wear tests and static mechanical tests under tri-axial non-uniform compression at different temperatures. It is claimed that with the help of this method, the relation between the contact endurance strength of steel and the factors defining the condition of the surface can be established.

In a paper "On Temperature Measuring Methods in the Friction Process between Solid Bodies" by S. A. Sukhov, Candidate of Technical Sciences, a method for measuring the temperature gradients in the immediate vicinity of the friction surfaces with the help of a natural thermocouple was presented. Both sliding bodies (pin and ring) are made of the same material, but the pin end face is covered with a thin layer of another metal.

Scientific and Technical Conference in Kiev on  
the Wear Resistance and Service Life of Machines

which constitutes the natural thermocouple of which one junction is at the gliding surface and the other is the bond between the oxide film and the coating metal.

Great interest was aroused by the paper "The Variation of Wear Resistance of Certain Anti-friction Alloys under Nuclear Radiation" by B.L. Slin'ko. Precipitation-hardening alloys (beryllium copper G2 and nickel silicon bronze Bp. KH 1-3) have their strength and wear resistance increased by nuclear radiation. Alloys changing their properties mainly as a result of phase transformations and having a higher re-crystallisation temperature change their properties insignificantly.

properties insignificantly. In a paper "Foundations of the Cavitation-erosion Failure of Ferrous Alloys", I.N. Bogachev, Doctor of Technical Sciences, and R.I. Mintz, Candidate of Technical Sciences, generalized the studies of the effect of the chemical and phase composition of iron carbon alloys on their cavitation erosion resistance. Increasing the carbon content from 0.02% to 1.2% improves the erosion resistance. The effect of alloying is due solely to the metallographic structure obtained. A pronounced improvement of erosion resistance is obtained in spheroidal graphite cast iron.

The Third Scientific and Technical Conference on the Improvement of the Wear Resistance and Service Life of Machines

Engineer D.A. Charynyan in his paper "Investigation of Nickel Alloys under Dry Friction at Elevated Temperatures" reported the results of his test which showed nickel alloys have the best wear resistance at high temperatures, whilst initial hardness is of little consequence. The optimum composition of a new alloy with a high wear resistance at 400 °C was given, whilst high-speed steel and ordinary chromium steels have little wear resistance under dry friction at high temperatures. V.P. Grechin, Candidate of Technical Sciences, concluded in his paper "The Heat Resistance of Cast Iron as the Main Factor in its Wear Resistance under Sliding Friction" that the hardness of cast iron at high temperatures (up to 850 °C) determines its wear resistance. Based on numerous studies of various past years, recommendations for alloying and for the application of cast irons under different conditions were given. It was noted by N.I. Kovalenko, Candidate of Technical Sciences, in his paper "The Wear Resistance of Wire Ropes" that the rubbing down of a wire rope is caused by an abrasive medium and its failure occurs before fatigue sets in. The author recommended

Technical Conference is Given on the Improvement of Wear Resistance and Service Life of Machines

on steel pulleys. In un lubricated operation, the wear life of wire ropes by a factor of 2-3. In his paper, "Alloys for Wear-resistant Hard Facing Deposits", stated the theoretical basis and methods of alloying to obtain the desired results and surveyed the fields of application of different methods of deposition on wearing components.

In his paper, "Electric Slag Method of Hard Facing for Wear Resistance", I.K. Pokhodnya, Candidate of Technical Sciences, suggested the electric slag process for hard facing of different components and concluded that this method is appropriate when large quantities of metal have to be deposited or when large numbers of components require treatment.

M.V. Simonenko, Engineer, suggested in his paper "The Electrolytic Diffusion Method of Making Bi-metal Components" a novel method of manufacturing copper base alloys. The alloying proceeds at a temperature much below the fusion temperature of copper. Great economies are achieved in labour cost and in scarce metals. Small scale and automatic production procedures can be applied. Some

United Scientific and Technical Conference on the  
Topic of the New Resistance and Service Life of Machines

These have contributed to reliable operation

of the machine in operation

in the conditions of technical reliability

of the machine in operation



properties by enrichment with carbon  
surface. The latter methods mainly improve the anti-seizure  
properties, whilst the former improve wear resistance.  
Sulphiding can be achieved in solid, liquid and gaseous media;

...the technical content of the ...  
...of the Wear Resistance and Service Life of Machines



"APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000513820003-9

Library of Congress

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000513820003-9"

AUTHOR:

Frumin, I.I.

125-1-1/15

TITLE:

About the Attainability of Equilibrium Between Slag and Metal in Welding and Fusion (O vozmozhnosti ravnovesiya mezhdu shlakom i metallom pri svarke i naplavke)

PERIODICAL:

Avtomaticheskaya Svarka, 1958, <sup>//</sup># 1, pp 3 - 13 (USSR)

ABSTRACT:

Investigations were carried out on metal and slag compositions during welding under flux, saturated with silica. Only in one case is it known that investigations were carried out dealing with equilibrium in open arc welding. The author points to a table containing the results of 6 experiments and the initial composition and analysis results of seam metals and slages; the slag was taken from seams and metallic drops and non reacted flux was cleaned off.

Comparing tables 4 and 5, it appears that in none of the experiments equilibrium could be obtained in temperatures preceding metal hardening.

The author concludes that each welded metal part undergoes the same subsequent processes, i.e. heating, mixing with liquid slag, separation of metal and slag, cooling off and crystallization.

Card 1/ 3

Investigations of open arc welding have shown that in

125-I-1/15

About the Attainability of Equilibrium Between Slag and Metal in Welding  
and Fusion

many cases slag and metal compositions correspond to equilibrium at high temperatures. In other cases only a trend towards equilibrium was established. Experimental investigations of metal and slag compositions were carried out as to welding under flux containing more than 50%  $\text{SiO}_2$  and more than 90% ( $\text{SiO}_2$ -  $\text{MnO}$  -  $\text{FeO}$ ) with a different composition of the welding rod and the primary metal. Computations of the equilibrium of the composition of metals according to formulas submitted by A.D. Kramarov were carried out for acid slag saturated with silica.

Furthermore, it was established that in some cases the slag and metal composition corresponds to the equilibrium in temperatures of about  $1,700^\circ\text{C}$ . In the majority of cases, equilibrium was not attained. The decrease of the reaction speed in the cooling off of liquid metals causes the fixing of the compositions corresponding to high temperatures.

Thermodynamic computations allow only an approximate determination of the direction of slag-metal interaction in welding.

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125-1-1/17

About the Attainability of Equilibrium Between Slag and Metal in Welding and Fusion

There are 13 Russian, 5 English and 1 German references.

ASSOCIATION: The Institute of Electrowelding imeni Ye.A. Paton (Institut elektrosvarki imeni Ye.O. Patona) of the Ukrainian SSR Academy of Sciences.

SUBMITTED: 29 October, 1957

AVAILABLE: Library of Congress

Card 3/3

FRUMIN, I. I., Doc Tech Sci (diss) -- "The metallurgical principles of an automatic wear-resistant weld seam". Kiev, 1959. 36 pp (Leningrad Polytech Inst im M. I. Kalinin), 200 copies (KL, No 23, 1959, 164)

25(1)

PHASE I BOOK EXPLOITATION

SOV/3353

Frumin, Isidor Il'ich

Avtomaticheskaya naplavka pod flyusom (Automatic Flux-shielded Hard Facing)  
Moscow; Mashgiz, 1959. 109 p. 8,500 copies printed.  
(Series: Biblioteka svarshchika)

Editorial Board: A. Ye. Asnis, A.A. Kazimirov, B.I. Medovar, B.Ye. Paton  
(Resp. Ed.), and V.V. Podgayetskiy; Ed. of this Vol: V.V. Podgayetskiy,  
Candidate of Technical Sciences; Ed.: V. V. Mayevskiy; Chief Ed. (Southern  
Division, Mashgiz): V.K. Serdyuk, Engineer.

PURPOSE: This book is intended for welders.

COVERAGE: Modern methods of flux-shielded hard facing are briefly explained.  
Techniques of hard-facing articles of various shapes are discussed. Designs  
of the most widely used hard-facing equipment are described. Typical applica-  
tions of automatic hard facing are mentioned: restoration of worn tractor and  
automotive parts, increasing the wear resistance of rolling mill rolls and other  
metallurgical equipment, etc. There are 11 references, all Soviet.

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AVAILABLE: Library of Congress (TK4660.F78)

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VK/gmp  
4-19-60



[illegible]

М.: В. Гармаш; Тех. М.: З. Матусевич.

**REMARKS:** This book is intended for workers in the welding industry.

**COMMENT:** The book contains a discussion of welding techniques and problems by groups of scientists and engineers. The attention is given to problems in the application of new methods of automated welding and electroslag welding. This is the second collection of articles under the same title prepared and published by the Institute of Electromechanics, Lenin I.E.O. Atom. Institute of Atomic Energy (formerly Lenin I.E.O. Atom). The first was written by A.N. Atom. Academics of the Ukrainian Academy of Sciences and winner of the Lenin Prize. There are no references.

[illegible]

McNair, R. I. (Candidate of Technical Sciences), A. N. Sverdlov  
[Magnitnyy] Magnetic electrovacuum lamp No. 0. Patent (Electric Welding  
Institute lamp No. 0. Patent ), and I. V. Zymalukha [Lead of Welding  
Department; Potentially multibeam structure lamp No. 0. Opto-  
hologram (Potentially Mechanism Lamp No. 0. Opt. hologram)], Electro-  
slag welding of large flanges of 100-250 mm diameter steel

Overvich, S. K. (Candidate of Technical Sciences), V. P. Dubinskii—  
technician; I. D. Zegrebayev (Engineer, Institut Elektromekhaniki (Insti-  
tute of Electromechanics)), A. A. Kuznetsov (Engineer), P. S. Shiga-  
lov (Electric Welding Institute (Inst. for Electric Welding)), A. A. Shiga-  
lov (Head of Welding Office), and V. P. Shcheglov (Technologist of a  
welding shop). Electro-slag Automatic Arc Welding of Medium and Large  
Welding Shop).

**Richards of Miami**  
**Peabody, L. E.** (College of Physical Sciences), V. P. Subversively  
 (Chairman), 1947-1950, 1951-1952, 1953-1954, 1955-1956, 1957-1958, 1959-1960, 1961-1962, 1963-1964, 1965-1966, 1967-1968, 1969-1970, 1971-1972, 1973-1974, 1975-1976, 1977-1978, 1979-1980, 1981-1982, 1983-1984, 1985-1986, 1987-1988, 1989-1990, 1991-1992, 1993-1994, 1995-1996, 1997-1998, 1999-2000, 2001-2002, 2003-2004, 2005-2006, 2007-2008, 2009-2010, 2011-2012, 2013-2014, 2015-2016, 2017-2018, 2019-2020, 2021-2022, 2023-2024, 2025-2026, 2027-2028, 2029-2030, 2031-2032, 2033-2034, 2035-2036, 2037-2038, 2039-2040, 2041-2042, 2043-2044, 2045-2046, 2047-2048, 2049-2050, 2051-2052, 2053-2054, 2055-2056, 2057-2058, 2059-2060, 2061-2062, 2063-2064, 2065-2066, 2067-2068, 2069-2070, 2071-2072, 2073-2074, 2075-2076, 2077-2078, 2079-2080, 2081-2082, 2083-2084, 2085-2086, 2087-2088, 2089-2090, 2091-2092, 2093-2094, 2095-2096, 2097-2098, 2099-2100, 2101-2102, 2103-2104, 2105-2106, 2107-2108, 2109-2110, 2111-2112, 2113-2114, 2115-2116, 2117-2118, 2119-2120, 2121-2122, 2123-2124, 2125-2126, 2127-2128, 2129-2130, 2131-2132, 2133-2134, 2135-2136, 2137-2138, 2139-2140, 2141-2142, 2143-2144, 2145-2146, 2147-2148, 2149-2150, 2151-2152, 2153-2154, 2155-2156, 2157-2158, 2159-2160, 2161-2162, 2163-2164, 2165-2166, 2167-2168, 2169-2170, 2171-2172, 2173-2174, 2175-2176, 2177-2178, 2179-2180, 2181-2182, 2183-2184, 2185-2186, 2187-2188, 2189-2190, 2191-2192, 2193-2194, 2195-2196, 2197-2198, 2199-2200, 2201-2202, 2203-2204, 2205-2206, 2207-2208, 2209-2210, 2211-2212, 2213-2214, 2215-2216, 2217-2218, 2219-2220, 2221-2222, 2223-2224, 2225-2226, 2227-2228, 2229-2230, 2231-2232, 2233-2234, 2235-2236, 2237-2238, 2239-2240, 2241-2242, 2243-2244, 2245-2246, 2247-2248, 2249-2250, 2251-2252, 2253-2254, 2255-2256, 2257-2258, 2259-2260, 2261-2262, 2263-2264, 2265-2266, 2267-2268, 2269-2270, 2271-2272, 2273-2274, 2275-2276, 2277-2278, 2279-2280, 2281-2282, 2283-2284, 2285-2286, 2287-2288, 2289-2290, 2291-2292, 2293-2294, 2295-2296, 2297-2298, 2299-2300, 2301-2302, 2303-2304, 2305-2306, 2307-2308, 2309-2310, 2311-2312, 2313-2314, 2315-2316, 2317-2318, 2319-2320, 2321-2322, 2323-2324, 2325-2326, 2327-2328, 2329-2330, 2331-2332, 2333-2334, 2335-2336, 2337-2338, 2339-2340, 2341-2342, 2343-2344, 2345-2346, 2347-2348, 2349-2350, 2351-2352, 2353-2354, 2355-2356, 2357-2358, 2359-2360, 2361-2362, 2363-2364, 2365-2366, 2367-2368, 2369-2370, 2371-2372, 2373-2374, 2375-2376, 2377-2378, 2379-2380, 2381-2382, 2383-2384, 2385-2386, 2387-2388, 2389-2390, 2391-2392, 2393-2394, 2395-2396, 2397-2398, 2399-2400, 2401-2402, 2403-2404, 2405-2406, 2407-2408, 2409-2410, 2411-2412, 2413-2414, 2415-2416, 2417-2418, 2419-2420, 2421-2422, 2423-2424, 2425-2426, 2427-2428, 2429-2430, 2431-2432, 2433-2434, 2435-2436, 2437-2438, 2439-2440, 2441-2442, 2443-2444, 2445-2446, 2447-2448, 2449-2450, 2451-2452, 2453-2454, 2455-2456, 2457-2458, 2459-2460, 2461-2462, 2463-2464, 2465-2466, 2467-2468, 2469-2470, 2471-2472, 2473-2474, 2475-2476, 2477-2478, 2479-2480, 2481-2482, 2483-2484, 2485-2486, 2487-2488, 2489-2490, 2491-2492, 2493-2494, 2495-2496, 2497-2498, 2499-2500, 2501-2502, 2503-2504, 2505-2506, 2507-2508, 2509-2510, 2511-2512, 2513-2514, 2515-2516, 2517-2518, 2519-2520, 2521-2522, 2523-2524, 2525-2526, 2527-2528, 2529-2530, 2531-2532, 2533-2534, 2535-2536, 2537-2538, 2539-2540, 2541-2542, 2543-2544, 2545-2546, 2547-2548, 2549-2550, 2551-2552, 2553-2554, 2555-2556, 2557-2558, 2559-2560, 2561-2562, 2563-2564, 2565-2566, 2567-2568, 2569-2570, 2571-2572, 2573-2574, 2575-2576, 2577-2578, 2579-2580, 2581-2582, 2583-2584, 2585-2586, 2587-2588, 2589-2590, 2591-2592, 2593-2594, 2595-2596, 2597-2598, 2599-2600, 2601-2602, 2603-2604, 2605-2606, 2607-2608, 2609-2610, 2611-2612, 2613-2614, 2615-2616, 2617-2618, 2619-2620, 2621-2622, 2623-2624, 2625-2626, 2627-2628, 2629-2630, 2631-2632, 2633-2634, 2635-2636, 2637-2638, 2639-2640, 2641-2642, 2643-2644, 2645-2646, 2647-2648, 2649-2650, 2651-2652, 2653-2654, 2655-2656, 2657-2658, 2659-2660, 2661-2662, 2663-2664, 2665-2666, 2667-2668, 2669-2670, 2671-2672, 2673-2674, 2675-2676, 2677-2678, 2679-2680, 2681-2682, 2683-2684,

[illegible][illegible]

FRUMIN, I. I.

28(1) PHASE I BOOK EXPLOITATION SOV/2156

Soveshchaniye po kompleksnoy mekhanizatsii i avtomatizatsii tekhnologicheskikh protsessov. 2nd, 1956.

Avtomatizatsiya mashinostroitel'nykh protsessov /trudy sovetskikh inzhenerov, tom 1. Goryachaya obrabotka metallor (Automation of Machine-Building Processes; Proceedings of the Conference on Over-All Mechanization and Automation of Technological Processes, Vol. 1: Hot Metal-Forming) Moscow, 1959. 394 p. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR, Institut mashinovedeniya. Komissiya po tekhnologii mashinostroyeniya.

Resp. Ed.: V.I. Dikushin, Academician; Compiler: V.M. Isakov; Ed. of Publishing House: V.A. Kotov; Tech. Ed.: I.P. Kus'min.

PURPOSE: The book is intended for mechanical engineers and metallurgists.

COVERAGE: The transactions of the Second Conference on the Over-All Mechanization and Automation of Industrial Processes, September 25-29, 1956, have been published in three volumes. This book, Vol. 1, contains articles under the general title, Hot Working of Metals. The investigations described in the book were conducted by the Sections for Automation and Hot Working of Metals, under the direction of the following scientists: casting - F.M. Aksekov, D.Ye. Kabanov and G.M. Orlov; forming - A.I. Tseltkov, A.D. Tselisov and V.M. Isakov; welding - G.A. Nikolayev, B.I. Prolov and G.A. Maslov. There are 185 references: 112 Soviet, 34 English, 6 German, and 1 French.

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AVAILABLE: Library of Congress	

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9/15/59

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FRUMIN, I. I.

TABLE I BOOK EXPLOITATION

SOV/5078

Academy of Sciences, USSR. Institute of Electrochemistry

Ukrainian SSR, Kiev. Institute of Electrochemistry

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S/137/61/000/011/056/123  
A060/A101

AUTHOR: Frumin, I.I.

TITLE: Automatic wear-resistant build-up

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 11, 1961, 57, abstract  
11Ye367 (V sb. "1-ya Sibirsk. konferentsiya po svarke, 1959",  
Barnaul, 1959(1960), 53-95)

TEXT: The author considers automatic electric arc building up by the submerged process, building up in a stream of protective gas, electric pulse building up (vibro-arc, electric-spark), electric-slag building up, building up by high-frequency current, alloying of the built up metal. Measures for preventing pores and cracks in course of building up, the structure and wear-resistance of the built-up metal are described. Examples are cited of the building up techniques for certain articles: forks, bands, railway wheels, bearing rollers and tension wheels, tractor treads, connecting rods for tractor engines, rolling rolls, parts for the charging apparatus of blast furnaces, beaters of hammer crushers. Electric slag building up of cores for ingot

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Automatic wear-resistant.....

S/137/61/000/011/056/123  
A060/A101

grippers, and the automatic building up of bronze layers is considered.  
There are 15 references.

✓

V. Tarisova

[Abstracter's note: Complete translation]

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FRUMIN, Isidor Il'ich; LEVNACHUK, Yevgeniy Ivanovich; YUZVENKO, Yuriy  
Arsen'yevich; NERODENKO, Mikhail Minovich; BOBROVA, T.L., red.;  
KOZLOVSKAYA, M.D., tekhn. red.; PERSON, M.N., tekhn. red.

[Principles of the technology of mechanized hard facing] Osnovy  
tekhnologii mekhanizirovannoi naplavki. Moskva, Vses.uchebno-  
pedagog.izd-vo Proftekhizdat, 1961. 303 p. (MIRA 15:1)  
(Hard facing)



FRUMIN, I.I.

PHASE I BOOK EXPLOITATION

EOV/5975

International Institute of Welding

XII kongress Mezhdunarodnogo Instituta svari, 29 iyunya - 5 iyulya 1959 v g.  
Opatil (Twelfth Annual Assembly of the International Institute of Welding,  
Opatija, June 29 - July 5, 1959) Moscow, Mashgiz, 1961. 359 p. 3000  
copies printed.

Sponsoring Agency: Natsional'nyy komitet SSSR po svarke.

Ed. (Title page): G. A. Maslov, Docent; Translated from English, French,  
and Serbo-Croatian by N. S. Aborenkova, K. N. Belyayev, E. P. Bogacheva,  
I. A. Borisova, K. V. Zvegintseva, V. S. Minavichev, and M. M. Shelechnik;  
Managing Ed. for Literature on the Hot-Working of Metals: S. Ya. Golovin,  
Engineer.

PURPOSE: This collection of articles is intended for welding specialists and  
the technical personnel of various production and repair shops.

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Twelfth Annual Assembly (Cont.)

SOV/5975

**COVERAGE:** The collection contains abridged reports presented and discussed at the Twelfth Annual Assembly of the International Institute of Welding. Reports deal with problems of welding and related processes used in repair work, repair techniques, and the problems arising in connection with the nature of the base and filler materials. Examples of repairing various parts are given, and the organization of repair operations in workshops and under field conditions is discussed. Economic aspects of welding and related processes as used in repair work are analyzed. No personalities are mentioned. There are no references.

**TABLE OF CONTENTS:** [Only Soviet and Soviet-bloc reports are given here]

Foreword

5

**PART I. THE STUDY OF REPAIR-WORK TECHNIQUES  
(PROCESSES, METHODS, PREPARATION, HEATING, AND  
OTHER TYPES OF PROCESSING CONTROL)**

Myuntsner, L. (Czechoslovakia). Welding of Broken Crankshafts

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SOV/5975

Twelfth Annual Assembly (Cont.)

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- Paton, B. Ye., G. Z. Voloshkevich, D. A. Didko, Yu. A. Sterenbogen, A. M. Makara, P. I. Sevbo, and D. O. Rozenberg (USSR). Electroslag Welding in Repairing Heavy Machines and Mechanisms 49
- Frumin, I. I., A. Ye. Asnis, L. M. Gutman, G. V. Ksendzyk, V. A. Lapchenko, Ye. I. Leynachuk, Ye. N. Morozovskaya, I. K. Pokhodnya, V. P. Subbotovskiy, and F. A. Khomus'ko (USSR). Automatic Wear-Resistant Submerged-Arc Surfacing 60
- Snegon, K. (Poland). Restoration of Rolling-Mill Rolls, Crane Rollers, Forging Dies, and Shears by Arc Welding 72

Card 3/9

PHASE I BOOK EXPLOITATION

SOV/5217

Frumin, Isidor Il'ich

Avtomaticheskaya elektrodugovaya naplavka (Automatic Electric-Arc Surfacing)  
Khar'kov, Metallurgizdat, 1961. 421 p. Errata slip inserted. 5,000 copies  
printed.

Resp. Ed.: V.K. Petrichenko; Ed. of Publishing House: S.S. Liberman;  
Tech. Ed.: S.P. Andreyev.

PURPOSE: This book is intended for engineers and technicians concerned with  
problems of metal surfacing. It may also be useful to scientific research  
workers and students at schools of higher education.

COVERAGE: Theoretical and practical bases of the automatic surfacing of metals  
are reviewed along with the results of experience gained in its industrial  
application. Also discussed are general metallurgical problems of welding  
and surfacing, the possibility of obtaining a given chemical composition of  
the deposited metal, conditions of the formation of gas pockets and hot  
cracks, and methods for the prevention of these formations. Materials used

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